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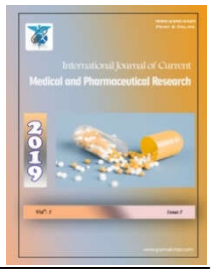

Research Article

EVALUATION OF THE EFFECT OF PERSONALLY SUPERVISED TOOTH-BRUSHING PROGRAMME USING AUDIO-TACTILE PERFORMANCE TECHNIQUE ON THE ORAL HEALTH STATUS OF VISUALLY IMPAIRED CHILDREN

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ABSTRACT

Objective: The present study was an in-vivo comparative study done on visually challenged children to evaluate the effect of a personally supervised tooth-brushing programme using audio-tactile performance technique on their oral health status.
Materials and Methods: The study compared the oral hygiene status of 75 visually impaired children in the age group 6-16 years after imparting oral hygiene maintainence instructions by three different methods viz Verbal instruction method, Braille script method and Audio-Tactile performance technique. Children were randomly assigned to three equal groups of 25 each. Oral hygiene status was evaluated before oral prophylaxis and after imparting education by assessing the scores of Gingival index by Loe and Silness and Turesky Modification of Quigley-Hein Plaque Index.
Results: On application of Kruskal - Wallis test, mean GI on visit at 1st week was not found alike ($p = 0.007$).Pairwise comparison with Tukey HSD test found significant difference between Groups 1 and 3.
Conclusion: The results of the present study concluded that it is required to frame a customized and individualized teaching approach and child specific oral health instructions program which has the capacity to address and resolve the unique problems of visually challenged .These education methods need to be extended and taught to parents and other responsible persons like caretakers and instructors so that repeated reinforcement can be performed periodically and this might bring about a complete and comprehensive oral health maintainence for the blind individuals.

INTRODUCTION

"The best and the most beautiful things in the world cannot be seen or even touched. They must be felt with the heart. - Hellen Keller."[1] Vision is the most essential sense of an individual by which he interprets and judges the world around him and when sight gets impaired especially in the childhood it poses detrimental effects on an individual.[2] Blindness has been defined by WHO as having a 'visual acuity of less than 3/60m or corresponding visual field loss in the better eye with the best possible correction', meaning that whilst a blind person could see three meters ,a non-visually impaired person could see 60 meters.[3] Oral health of disabled patients is frequently recognized as of secondary importance to the debilitating disease, according to what is commonly referred to as "halo effect".[4] There is a paramount need for the development of various innovative methods of delivering oral health education, especially for disabled individuals, so that they can acquire new knowledge and improve skills . The present study was undertaken to analyze the effect of personally supervised tooth-brushing programme using Audio-Tactile performance technique on the oral health status of visually impaired children.

MATERIALS AND METHOD

The present study was conducted on the visually impaired children in the Department of Pedodontics and Preventive dentistry, Mahatma Gandhi Dental College and Hospital, Jaipur in collaboration with a special school for blind by the name of Rashtriya Netraheen Vidyalaya located at Gangauri Bajaar, Jaipur. A total of 75 visually impaired children who were blind since birth were selected for the study and randomly divided into 3 equal groups according to the method that was supposed to be employed respectively for teaching tooth-brushing and oral hygiene maintenance.

Inclusion Criteria

- All the visually impaired children completely blind since birth in the age group of 6-16 years residing in the school only
- All the participants who gave informed consent
- The participants who attended regular classes for the majority of the school days and received vision related services from the teachers in the vision resource room and possessed adequate cooperation and learning capabilities.

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Exclusion Criteria

- Participants with blindness or visual impairment associated with any other systemic condition or associated disability
- Participants with abnormal mental development
- Participants with compromised learning capabilities
- Participants in whom there was presence of preexisting gingivitis or periodontitis
- Patients undergoing orthodontic or prosthodontic treatment.
- Participants on any antibiotic therapy or other medications
- Subjects in whom less than four teeth were present in each quadrant

Ethical Clearance

The Ethical clearance was obtained from The Ethics Committee of Mahatma Gandhi Dental College and Hospital which is a unit of Mahatma Gandhi University of Medical Sciences and Technology, Jaipur. After the nature of the study and the possible risks were fully explained, verbal consent from children as well as signed consent from school authorities was obtained on duly filled forms.

Sample Selection

The design of the study was a randomized clinical blind study. A total of 75 visually impaired children were randomly divided into 3 equal groups .The instructions included some essential points of oral hygiene regulation that were imparted in a general manner to the children like brushing teeth twice daily, regular mouth rinsing after meals, proper healthy diet, regular check-ups etc-

Group 1 -Verbal Instruction Group(N = 25): A set of point wise instructions on oral hygiene maintenance was framed and was verbally explained in hindi language to the subjects of this group.

Group 2 -Braille-script Group(N = 25): Same set of instructions was scripted in Braille and printed material was distributed to the subjects of this group and were made to read and understand.

Group 3 -Audio-Tactile Performance Group(N = 25): This included three components: Subjects were first informed about the importance of teeth and method of brushing using a pre-recorded audio clipping of the same set of instructions as were used for the other groups. The audio clipping was recorded by the operator in her own voice and no internet source was used. The subjects were made to feel the teeth on a large sized study model and they were taught to brush on this model with a toothbrush by holding their hand. Further, they were made to feel their own teeth with their tongue and were taught to brush with assistance which included the proper technique of brushing teeth and proper application of the toothpaste on the brush.

METHODOLOGY

The visually impaired subjects were brought in a group of 10 subjects per day to the Department of Pedodontics and Preventive Dentistry, Mahatma Gandhi Dental College and Hospital. Oral hygiene status was assessed on predetermined intervals on the basis of following parameters-

Gingival Health

Loe and Silness Gingival Index was used for the assessment of gingival health which was evaluated using a sterile caliberated periodontal probe at baseline and after 1 week,1 month and 3 months respectively after giving the oral hygiene maintenence instructions.

Bleeding on Probing

Bleeding on probing in each subject was measured using a sterile caliberated periodontal probe at baseline and after 1 week, 1 month and 3 months respectively after giving the oral hygiene maintenence instructions.

Evaluation of the Dental Plaque

Turesky Modification of Quigley-Hein Plaque Index was used by applying DPI two-tone Alphaplac disclosing solution and the Plaque index was evaluated at baseline and after 1 week,1 month and 3 months respectively after giving the oral hygiene maintenence instructions.

The subjects of each group were isolated from the other two groups in a manner that the methods of teaching oral hygiene maintenance and instructions given regarding that do not overlap each other and each group is completely segregated from the other groups. The follow up was done by visiting the visually impaired children in the school premises so as to avoid repeated inconvenience to the children. At each follow up, the scores of Gingival Index and Tureskey modification of Quigley-Hein Plaque index were noted down for each subject in the same manner as was done during the first visit. No oral prophylaxis was performed in the follow-up period. Reinforcement of the oral hygiene instructions was done in the follow up phase according to the mode of instruction decided for the group of that subject.

Statistical Analysis: MEDCALC Software 14.0.0 version was used for the statistical analysis of the recorded data.

RESULTS

Table no.1 Graph no.1 depicts the comparison of study groups according to age.

Mean age for Group 1 (Verbal instructions group) came out to be 11.84±1.77 ranging from 8 - 14 with a median value of 12. Mean age for Group 2 (Braille group)came out to be 11.84±1.77 ranging from 7-15 with a median value of 12. Mean age for Group 3 (Audio tactile performance group)came out to be 11.84±1.77 ranging from 6-16 with a median value of 11.On application of ANOVA test, mean age was found alike in all 3 groups (p=0.656)

Table no.2 Graph no.2 shows the comparison of study groups according to mean Gingival index. It is evident that at 1st visit, highest GI was found in Group 2(i.e. Braille instructions group) with a value of 1.22 followed by Group 1(i.e. verbal instructions group) with a value of 1.16 and Group 3 (i.e. Audio tactile performance group) with a value of 1.06. On application of Kruskal-Wallis test, mean GI at 1st visit in all 3 groups was found alike (p=0.144) .Similarly, at visit on 1st week, highest GI was found in Group 1 (1.04) followed by Group 2 (0.92) and Group 3 (0.87). On application of Kruskal-Wallis test, mean GI on visit at 1st week was not found alike (p = 0.007) . Pairwise comparison with Tukey HSD test found significant difference between Groups 1 and 3. Also it is evident that at 1 month , highest GI was found in Group 3

(0.88) followed by Group 2(0.82) and Group 1 (0.69). On application of Kruskal-Wallis test, mean GI at 1st visit in all 3 groups was found alike (p=0.220).Similarly at 3 months, highest GI was found in Group 1 (0.84) followed by Group 2(0.79) and Group 3 (0.66). On application of Kruskal-Wallis test, mean GI at 1st visit in all 3 groups was found alike (p=0.246)

Table no.3 Graph no.3 interprets the comparison of study groups according to mean Plaque index. It is evident that at 1st visit, highest PI was found in Group 1 (i.e. verbal instructions group) with a value of 1.41 followed by Group 2 (i.e. Braille group) with a value of 1.35 and Group 3 (i.e. Audio tactile performance group) with a value of 1.17. On application of Kruskal-Wallis test, mean GI at 1st visit in all 3 groups was found alike (p=0.107).Similarly, at visit on 1st week, highest PI was seen to be in Group 3 (0.99) followed by Group 2 (0.78) and Group 3 (0.73). On application of Kruskal - Wallis test, mean PI at 1st visit in all 3 groups was found alike (p=0.144). Also it is evident that at 1 month , highest PI was found in Group 1 (1.02) followed by Group 2(0.80) and Group 3 (0.77). On application of Kruskal-Wallis test, mean PI at 1st visit in all 3 groups was found alike (p=0.209). Similarly at 3 months, highest PI was found in Group 2 (0.93) followed by Group 1(0.90) and Group 3 (0.81). On application of Kruskal-Wallis test, mean PI at 1st visit in all 3 groups was found alike (p=0.420)

DISCUSSION

Esthetically acceptable and functionally adequate dentitions are seen to affect a person's self-esteem, confidence and socialization. Oral health of a person comprises of strong biological, psychological and social projections. Oral health education is inclined towards providing an explanation of the aim of oral hygiene and demonstrations of tooth brushing and inter-dental cleaning. It usually takes aid of visual methods like disclosing agents and tooth models. But, these education modalities are not of use in handicapped children especially when a child is visually impaired. Visual impairment seems to be like leading a life in anonymity and it is one of those disabilities that effects human life at a large. Visually impaired people experience difficulty in daily activities but possess a sense of the world around them which they can only feel but not visualize.[5] They face hardships in simple application of toothpaste on toothbrush and often practice wrong brushing strokes which are detrimental to oral structures. This can further lead to a damaged periodontium, higher levels of gingivitis and deposition of plaque and calculus.[6] The results of our study indicate that the overall oral hygiene status of the visually impaired subjects improved significantly at the completion of the study. Krishna Kumar *et al*[7,8] after the stepwise implementation of oral health education module in different forms like Braille, Audio or their combination etc-concluded that there was a reduction in the oral plaque scores showing the effectiveness of the motivation element within the programme. Nandini *et al*[1] did a study to assess the oral health and hygiene practices in 150 visually impaired children and concluded that it is essential to instill a proper attitude towards oral health maintainence in visually impaired children and this requires a special teaching approach along with time and patience. Hebbal and Ankola [9] used ATP technique to impart oral health education to visually impaired children. The results of our study proved that no education method is alone superior over the other and only a well framed combination of all can achieve a remarkable improvement in the oral health status of visually challenged children. Each individual study group has its own drawbacks for example Verbal group contained only the oral hygiene instructions narrated verbally and these were bound to be forgotten by the children over a period of time until and unless the proper reinforcement of these instructions took place .Similarly, Braille instructions group can be categorized as a very non-interesting method of teaching in which again no individual attention was paid for the education. Audio-tactile performance can be stated as an interesting and effective method of imparting knowledge but it cannot deliver significant results till the subjects actually put into practice what they have learnt .The findings of our study thus brings up the importance of developing a very efficient combined system of teaching methods and reinforcement of the knowledge at suitable intervals of time and it supports the requirement to frame an individualized approach and child-specific oral health instructions program which has the capacity to address and resolve the unique problems of visually challenged.

CONCLUSION

- No education method alone is superior over the other and only a well framed and well-executed combination of all the methods can achieve a remarkable improvement in delivering of oral hygiene instructions and subsequently the oral health status of visually challenged children.
- The findings bring up the importance of developing a very efficient combined system of teaching methods which is simple to formulate and to execute for the dentist.

Reinforcement of the knowledge by professionals at suitable intervals of time that can encourage blind children to change their attitude towards oral health care maintainence

Table 1 comparison of study groups according to age

Group	N	Mean	SD	Median	Minimum	Maximum	'p' Value*
1	25	11.84	1.77	12	8	14	
2	25	11.32	2.43	12	7	15	0.656
3	25	11.18	3.51	11	6	16	

*ANOVA - Analysis of Variance

Table 2 Comparison of Study Groups According To Mean GI

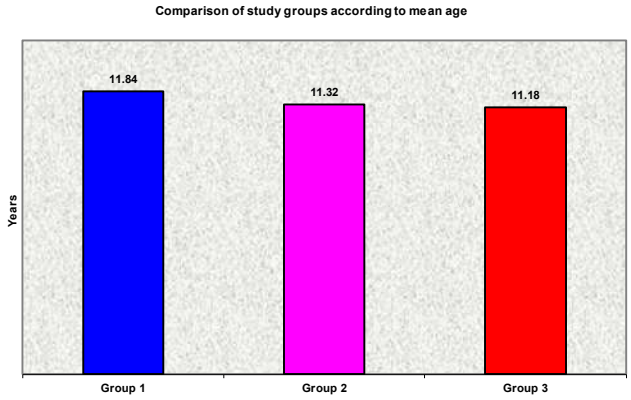
Visit	Group 1	Group 2	Group 3	'p' Value*	Significant difference between#
1st visit	1.16	1.22	1.06	0.144	-
1 week	1.04	0.92	0.87	0.007	Group 1 & 3
1 month	0.69	0.82	0.88	0.220	-
3 month	0.84	0.79	0.66	0.246	-

*Kruskal Wallis Test #Tukey HSD Test

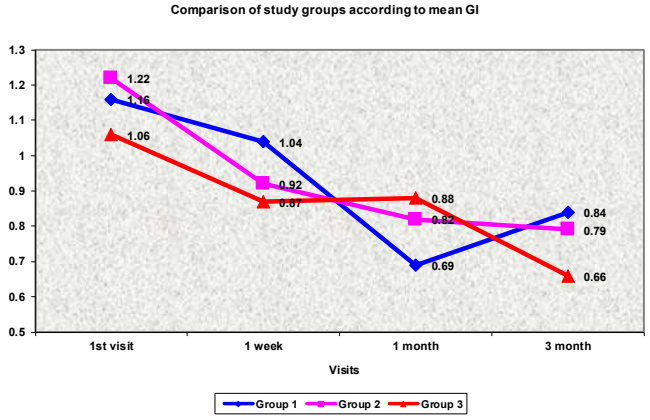
Table 3 Comparison of Study Groups According To Mean PI

Visit	Group 1	Group 2	Group 3	'p' Value*
1st visit	1.41	1.35	1.17	0.107
1 week	0.73	0.78	0.99	0.440
1 month	1.02	0.80	0.77	0.209
3 month	0.90	0.93	0.81	0.420

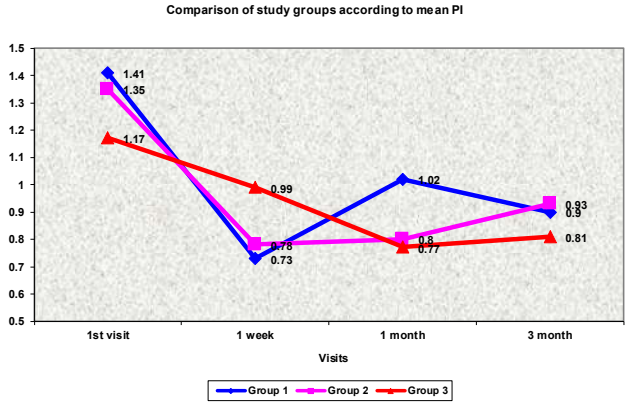
*Kruskal Wallis Test



Graph 1



Graph 2



Graph 3

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